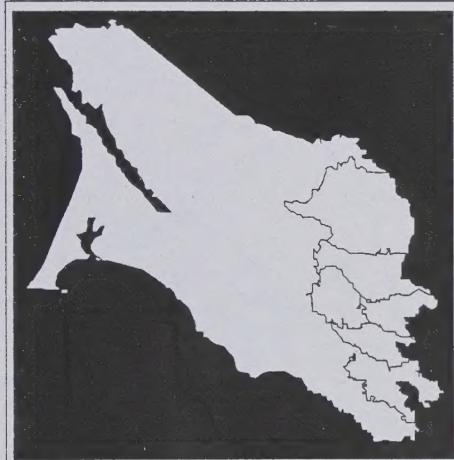


The Marin Countywide Plan

Noise Element Technical Report #2
Preparation of General Plan Noise Exposure Contours for
the Commercial Heliport Located on Richardson Bay



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The location of the heliport is shown on Figure 1. The heliport is operated by Commodore Helicopters, Inc., and all flights to and from the helipad must obtain permission from Commodore Helicopters. Presently, the only helicopters that operate at the pad are four Bell Model 206-B jet rangers and one privately owned Engstrom commuter helicopter. Commodore Helicopters bases two or three of its jet rangers at the Richardson Bay helipad and one or two of the jet rangers at its helipad on Pier 43 in San Francisco. The number of flights at either pad is determined by weather conditions, which influence the popularity of the tourist flights flown from the Pier 43 pad.

Under typical conditions, only two daily flights are scheduled at the Richardson Bay helipad, on weekdays. Monday through Friday, a helicopter leased by KGO News leaves at approximately 7 a.m. and returns at about 9 a.m. Later in the day, the helicopter leaves at 4 p.m. and returns at about 5:15 p.m. KPIX also leases a helicopter from Commodore and it is flown once or twice a week.

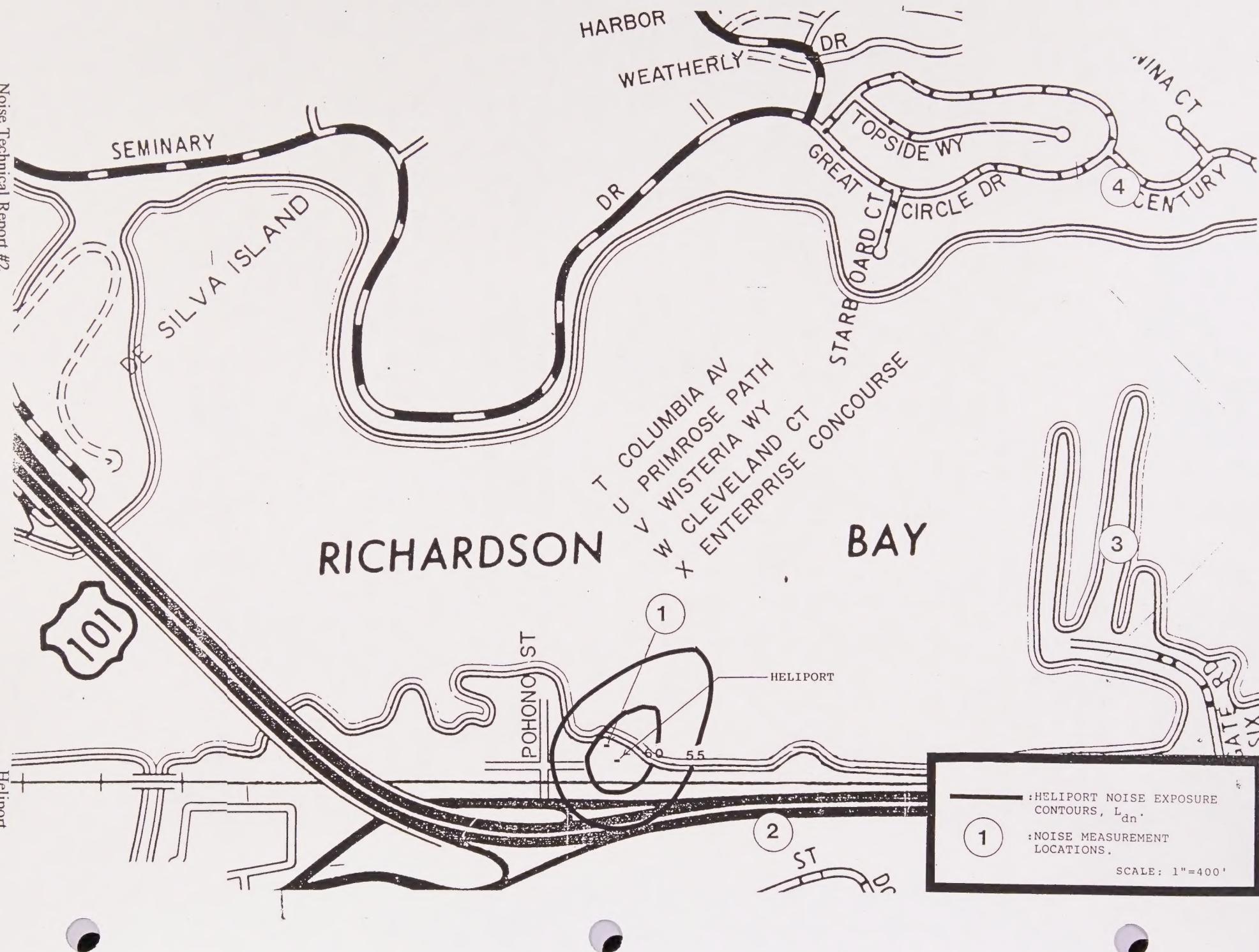
During the day (including Saturdays and Sundays) the helicopters based at the Pier 43 helipad in San Francisco stop at the Richardson Bay site for refueling. The number of these trips depends upon the season, with about three refueling operations per day in the busier summer months and one per day in the winter months.

No flights occur between 10 p.m. and 7 a.m.

The heliport operator said the approved flight path leads from the pad towards San Francisco, through the center of Richardson Bay. The helicopter rises from the pad to an altitude of 600 to 700 feet at the Gate 6 Marina and to an altitude of 1000 feet over Sausalito. This path is reversed on landing.

To quantify the noise generated by the helicopters on takeoff and landing, the consultant performed a series of measurements in the vicinity of the pad. The noise measurement locations are shown on Figure 1. The measurement locations were chosen to represent the nearest residential development to the pad, specifically the houseboats located off the end of Pohono Street, the Marin Headlands development across the freeway from the helipad, the houseboats in the vicinity of Gate 6 Marina, and the single-family homes on Strawberry Point. Location 1 was a pole situated 100 feet from the helipad. Location 2 was positioned off Donahue Street behind the Marin Headlands townhomes overlooking the helipad from the freeway right-of-way fence. Location 3 was situated at the Gate 6 Marina, and Site 4 was on Strawberry Point off Century Court.

Figure 1. Noise Measurement Locations



All takeoffs and landings during a 40 hour period were monitored at the location within 100 feet of the pad. The data obtained for each takeoff or landing is summarized in Table 1. For each takeoff and landing, the table shows the maximum A-weighted sound level generated by the helicopter and the Sound Exposure Level, or SEL. The sound exposure level normalizes the acoustical energy generated by an event to a one-second duration. It accounts for both the intensity and duration of an event. Events with different durations and different maximum A-weighted sound levels can be directly compared using the SEL. The SEL is used to compute the day/night average noise level (Ldn) for a series of repetitive events like helicopter takeoffs and landings.

**Table 1. Noise Levels Generated by Activities at the Heliport
as Measured at Location #1 (100 Feet from Helipad)**

Event	Time	Date	Sound Exposure Level (dB)	Maximum A- Weighted Noise Level (dB)
Takeoff	16:01:53	9/23/87	104.0	94.0
Landing, Refuel	16:34:02	9/23/87	99.5	90.0
and Takeoff	16:37:57	9/23/87	100.5	88.5
Landing	17:08:45	9/23/87	102.5	88.5
Landing	18:06:44	9/23/87	106.0	86.0
Takeoff	7:03:16	9/24/87	102.5	93.0
Landing	8:56:34	9/24/87	104.0	89.5
Takeoff	9:16:47	9/24/87	104.5	91.5
Landing	11:17:17	9/24/87	101.5	89.5
Landing	12:10:49	9/24/87	103.0	91.5
Takeoff	12:15:38	9/24/87	104.5	90.0
Takeoff	14:41:38	9/24/87	100.0	85.5
Takeoff	15:56:38	9/24/87	104.0	90.0
Landing	17:10:40	9/24/87	101.0	87.5
Landing, Refuel	17:42:30	9/24/87	100.0	88.5
and Takeoff	17:46:39	9/24/87	102.0	90.5
Landing	18:51:40	9/24/87	105.0	85.0
Takeoff	7:03:38	9/25/87	103.5	90.0
Landing	9:36:47	9/25/87	105.0	93.5

Table 2 shows the difference in the maximum A-weighted sound level and the SEL for a typical Bell 206 takeoff, at each of the four measurement locations. Also shown in Table 2 is the calculated Ldn from helicopter activity at each of these locations. Using the SELs measured at each location and the preferred flight path flown by the helicopters, the average annual Ldn noise exposure contours for the activity level described above are shown on the attached figure. It can be seen that only the houseboats immediately adjacent to the helipad are exposed to an Ldn in excess of 60 dB - the noise level at which the County's airport land use plan for Gnoss Field prohibits new residential development which would be exposed to aircraft noise.

**Table 2. Noise Levels Generated by Takeoff at 7:04 a.m. on 9/24/87
as Measured at Various Locations Surrounding the Heliport**

	Location	Sound Exposure Level, SEL (dB)	Maximum A-Weighted Noise Level, (dB)	Calculated Ldn
1.	100 Feet From Helipad	102.5	75	63
2.	Marin City at Right-of-Way, Fence Over Freeway	87.0	75	48
3.	Sausalito Spit - at the End of the Pavement	84.0	77	44
4.	10 Century Drive, Strawberry	79.8	68	40

During the measurements of the helicopter activity, the consultant attempted to quantify and develop contours for the Commodore seaplane operation. The flight path for seaplanes is the same as that for helicopters. When scouting out measurement locations for the heliport survey, the consultant observed a seaplane taking off and landing, but did not have monitoring equipment available at the time. Seaplane activity is sporadic and was not observed during the noise measurement survey. Due to the infrequency of seaplane activity, the consultant estimates that the Ldn 60 and 55 dB contours are within the confines of Richardson Bay. However, a precise location of these contours would require additional monitoring, an effort beyond the scope of the present study.

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